

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
25 November 2004 (25.11.2004)

PCT

(10) International Publication Number
WO 2004/101852 A3

- (51) International Patent Classification⁷: **C25B 11/04, C23C 18/42**
- (21) International Application Number: **PCT/US2004/014357**
- (22) International Filing Date: **7 May 2004 (07.05.2004)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data: **60/486,445 7 May 2003 (07.05.2003) US**
- (71) Applicant (*for all designated States except US*): **ELTECH SYSTEMS CORPORATION [US/US]; 100 Seventh Avenue, Suite 300, Chardon, OH 44024 (US).**
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **CARLSON, Richard, C. [US/US]; 51 216th Street, Euclid, OH 44123 (US). DIFRAMCO, Dino [US/US]; 553 Zorn Lane, Mayfield Village, OH 44143 (US). MOATS, Michael, S. [US/US]; 1604 Clipper Court, Painseville, OH 44077 (US). HARDEE, Kenneth, L. [US/US]; 15818 Georgia Road, Middlefield, OH 44062 (US).**
- (74) Agents: **TYRPAK, Michele, M. et al.; Renner, Otto, Boisselle & Sklar, LLP, 1621 Euclid Avenue, 19th Floor, Cleveland, OH 44115-2191 (US).**
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

(88) Date of publication of the international search report:
24 March 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/101852 A3

(54) Title: SMOOTH SURFACE MORPHOLOGY ANODE COATINGS

(57) Abstract: The present invention relates to an electrocatalytic coating and an electrode having the coating thereon, wherein the coating is a mixed metal oxide coating, preferably ruthenium, titanium and tin or antimony oxides. The coating uses water as a solvent that provides for a smoother surface than alcohol based solvents. The electrocatalytic coating can be used especially as an anode component of an electrolysis cell and in particular a cell for the electrolysis of aqueous chlor-alkali solutions.

INTERNATIONAL SEARCH REPORT

National Application No

1/US2004/014357

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C25B11/04 C23C18/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 C25B C23C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/148736 A1 (GEUSIC MARK J ET AL) 17 October 2002 (2002-10-17) paragraphs '0025! - '0031! example 1 -----	1-6, 9, 13-21, 24, 28, 29
X	US 4 318 795 A (BIANCHI GIUSEPPE ET AL) 9 March 1982 (1982-03-09) examples 7, 8 -----	1-5, 7-9, 12-14, 16-20, 22-24, 27, 28
A	US 6 527 924 B1 (ANDOLFATTO FRANCOISE ET AL) 4 March 2003 (2003-03-04) column 1, line 65 - column 3, line 2 ----- -/-	1-4, 12-14, 16-19, 27, 28

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the International search

22 October 2004

Date of mailing of the International search report

02/11/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Desbois, V

INTERNATIONAL SEARCH REPORT

International Application No
US2004/014357

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 189 358 A (BORNER WILLIAM G ET AL) 19 February 1980 (1980-02-19) examples 4,5 -----	1-4, 12-19, 27-29
A	US 4 005 004 A (SEKO MAOMI ET AL) 25 January 1977 (1977-01-25) column 3, line 35 - line 50 example 1 -----	12,27
A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 214 (C-362), 25 July 1986 (1986-07-25) & JP 61 052385 A (TDK CORP), 15 March 1986 (1986-03-15) abstract -----	1-29

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
... /US2004/014357

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 2002148736	A1	17-10-2002		BR 0206957 A CA 2437457 A1 EP 1360345 A2 NO 20033469 A WO 02063068 A2		09-03-2004 15-08-2002 12-11-2003 03-10-2003 15-08-2002
US 4318795	A	09-03-1982		US 3948751 A BE 725491 A BE 725492 A CA 962228 A1 CA 925045 A1 CS 222661 B2 DE 1814567 A1 DE 1814576 A1 DE 1818035 B1 DE 1818051 C2 DK 148660 B ES 361436 A1 ES 366987 A1 ES 366988 A1 FR 1595024 A FR 1597806 A GB 1231280 A GB 1235570 A IL 31129 A IL 31209 A NL 6817957 A ,B, NL 6817966 A NL 7908873 A ,C NO 138664 B PH 12129 A PH 12145 A PL 80632 B1 SE 411674 B SE 7902439 A SU 976838 A3 US 3846273 A US 3810770 A US 3616445 A US 4003817 A YU 292668 A ,B YU 294568 A ,B SE 432448 B US 4070504 A		06-04-1976 13-06-1969 13-06-1969 04-02-1975 24-04-1973 29-07-1983 14-08-1969 26-11-1970 16-08-1979 27-11-1986 26-08-1985 16-11-1970 16-05-1972 16-06-1971 08-06-1970 29-06-1970 12-05-1971 16-06-1971 30-03-1973 30-08-1972 17-06-1969 17-06-1969 31-03-1980 10-07-1978 07-11-1978 07-11-1978 30-08-1975 28-01-1980 19-03-1979 23-11-1982 05-11-1974 14-05-1974 26-10-1971 18-01-1977 30-06-1976 31-12-1976 02-04-1984 24-01-1978
US 6527924	B1	04-03-2003		FR 2797646 A1 AU 7014300 A CA 2347728 A1 CN 1348510 T EP 1125005 A1 WO 0114615 A1 JP 2003507580 T NO 20011931 A		23-02-2001 19-03-2001 01-03-2001 08-05-2002 22-08-2001 01-03-2001 25-02-2003 28-05-2001
US 4189358	A	19-02-1980		AU 523857 B2 AU 4873379 A CA 1129805 A1 CA 1157811 A2		19-08-1982 17-01-1980 17-08-1982 29-11-1983

INTERNATIONAL SEARCH REPORT

Information on patent family members

National Application No

PCT/US2004/014357

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
US 4189358	A		DE 2964533 D1 EP 0007239 A2 EP 0029272 A2 EP 0047566 A2 FI 792211 A ,B, JP 1416523 C JP 55058387 A JP 62023078 B NO 792299 A ,B,	24-02-1983 23-01-1980 27-05-1981 17-03-1982 15-01-1980 22-12-1987 01-05-1980 21-05-1987 15-01-1980
US 4005004	A	25-01-1977	JP 51037877 A JP 52020440 B DE 2543033 A1 FR 2286209 A1 GB 1481767 A	30-03-1976 03-06-1977 15-04-1976 23-04-1976 03-08-1977
JP 61052385	A	15-03-1986	JP 6033489 B	02-05-1994